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SCIENCE NEWS LETTER

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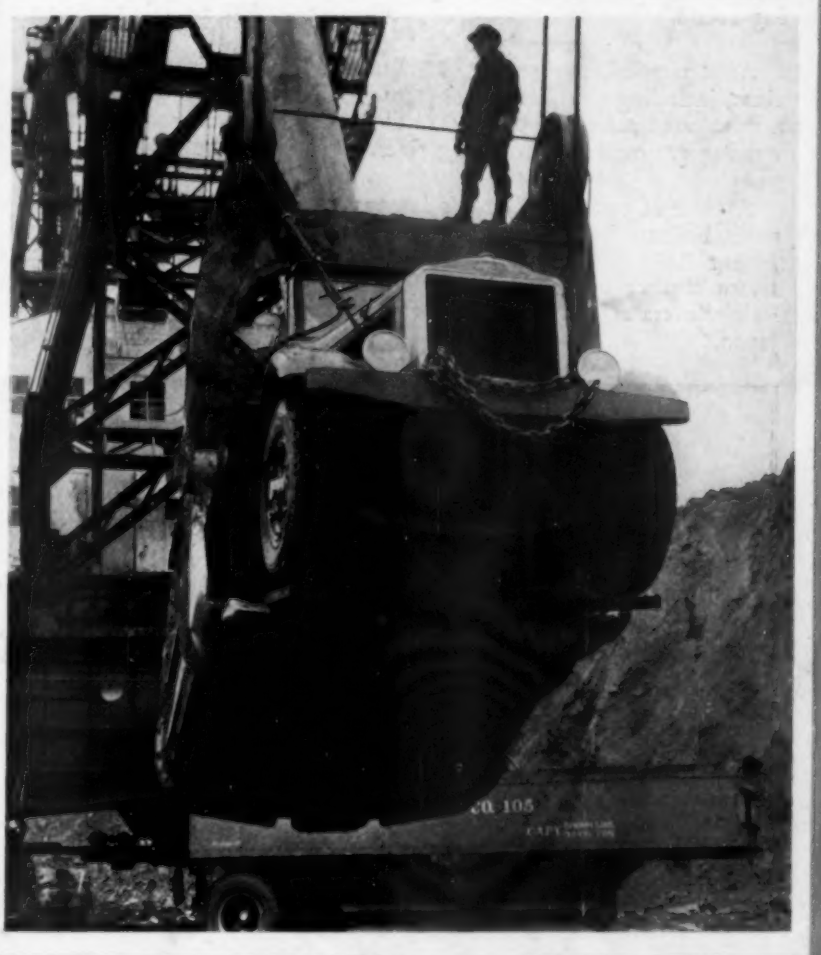
THE WEEKLY SUMMARY OF CURRENT SCIENCE •



JANUARY 25, 1936

Biggest Shovel

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXIX *No. 772*

The Weekly Summary of

Current Science

Published Every Saturday by

SCIENCE SERVICE

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DO YOU KNOW?

The largest animals live in the sea.

The tiniest flashlights now produced are only three inches long and one-half inch in diameter.

When a young bird sheds its down and grows feathers, the wings are the first be-feathered part of its body.

A Montreal department store employs a psychologist to deal with customers who fall behind in payments.

Testing caterpillars' response to noise, scientists report that many, perhaps all, caterpillars have some means of perceiving sound.

As a physical culture feat, 20 Russians, including six girls, recently made a militarized march of over 600 miles, wearing gas masks and carrying rifles.

A piece of rock from Japan's famous peak Fujisan has been presented to Mount Rainier National Park, and in return a piece of pumice from Mount Rainier's crater rim has been sent to Japan.

Ice ribbons are a form of ice suitable for beverage uses and for packing foods.

Special efforts to record folk songs and fairy stories are being made in the Soviet Union.

CCC workers have planted nearly half a billion trees in the past two and one-half years.

Thin zinc finishes that are being produced are resistant to finger staining and tarnish from the air.

An improved glass block for building purposes will stand up under pressure of 72,500 pounds to a single block.

Arsenic is found in the waters of many of the famous mineral springs, but the quantity is pronounced too small to be injurious.

To prevent spread of yellow fever to India by air traffic, a public health official suggests that airplanes should be mosquito proof, and other precautions should be taken to prevent transportation of infected mosquitoes.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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PLANT PHYSIOLOGY

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SAFETY ENGINEERING

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ZOOLOGY

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A SCIENCE SERVICE PUBLICATION

PHYSICS

New Cornell Atom Smasher to Find Uses in Cancer Study

Biological Research Including Possible Changes In Chromosomes and Genes Caused by Piercing Neutrons

BIOLOGICAL research, including the study of cancer, as well as physical science should benefit in the experimental program to be undertaken with the newest of all atom accelerators, just put in operation at Cornell University by Dr. M. Stanley Livingston, instructor in physics. Particles with 2,000,000 electron volts energy can be generated with the device.

Eastern leadership in the field of the conquest of matter is assumed by Cornell, states the University announcement, with the new device which is patterned after the famous 85-ton cyclotron equipment of Prof. E. O. Lawrence of the University of California.

Dr. Livingston was a co-worker of Prof. Lawrence in the design and construction of the West Coast apparatus, which has done so much for increasing knowledge of artificial radioactivity, the production of penetrating neutrons and studies on the transmutation of the chemical elements.

Besides investigations into the structure of the nuclei of atoms, it is planned to use Dr. Livingston's Cornell apparatus to test on mouse cancers the effects of neutrons which it will generate. This research will be conducted in cooperation with the New York State Institute of Malignant Diseases at Buffalo, N. Y.

Study Plants Too

In cooperation with other departments of the University, research is planned also on the effects of neutrons on plants, particularly fern spores, and on the eggs of some of the lower forms of animal life. A comparison will then be possible between the neutron's effects and those of X-rays and the gamma rays from radium.

Biologists too would like to see if the high-velocity neutrons from the apparatus can cause visible changes in the chromosomes which carry the pattern of animal makeup within them.

Also scheduled for investigation are the possibilities of mutations or gene changes caused by the piercing neutrons.

The biological applications of the research hold promise because of all the elements bombarded by other investigators with neutrons, hydrogen appears to have nearly the greatest stopping power. And the animal body contains large amounts of hydrogen in its makeup, both in the form of water and other more complicated chemical compounds. Neutrons therefore are expected to have striking and appreciable effects on such tissues.

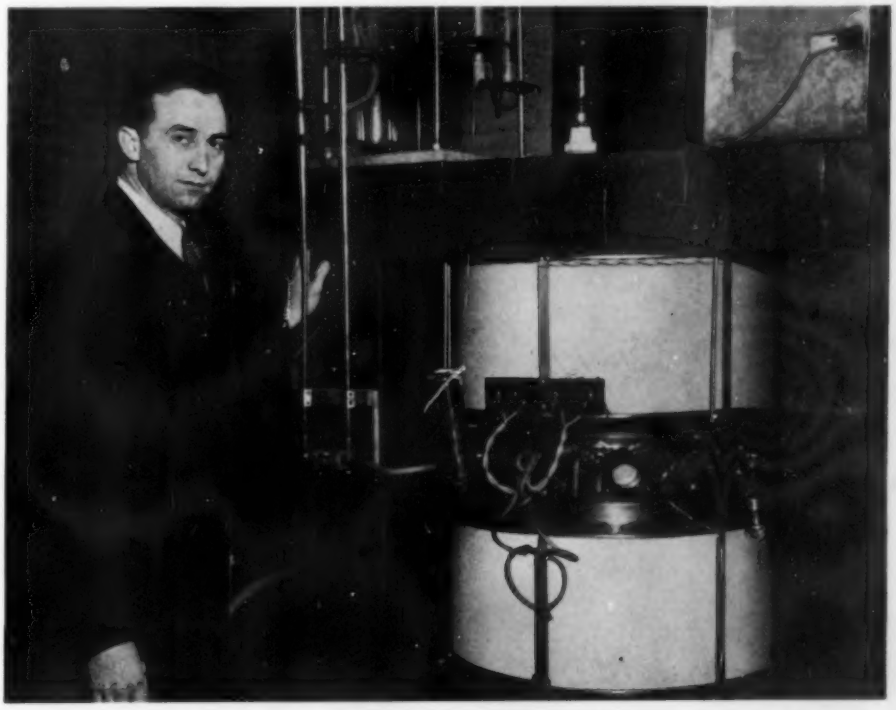
Weighing 6,500 pounds, Dr. Livingston's apparatus takes charged cores of hydrogen atoms and accelerates them within a pancake-shaped vacuum chamber lying flat between the pole pieces of a powerful electromagnet. Issuing near the center of the pole pieces, the particles travel in an ever-widening spiral parallel to the faces of the magnet's pole pieces. Twice during each trip around the particles receive a boost of electrical voltage which drives them faster and faster. The cumulative effect finally ends when the particles reach the periphery of the apparatus and they have been given energies of 2,000,000 electron volts by the series of electrical kicks.

When at their greatest velocity and energy they are picked off and directed against targets, which undergo a variety of effects, including transmutation and artificial radioactivity. In the process of impact, particles torn from the nuclei of the targets' atoms come off, and among them are the neutrons.

Action Described

Describing the action of the apparatus, Dr. Livingston states:

"The action may be compared with that of a swing which, starting from a period of rest, increases its arc with each to-and-fro movement. In both instances —whether swing or vibrating "bullet" —perfect rhythm is at once established.



CORNELL'S NEW ATOM SMASHER

Dr. M. Stanley Livingston, young Cornell University instructor, stands beside the newest tool of science for smashing atoms and learning secrets of the nucleus in high velocity impact experiments. The device, which generates high energy atomic "bullets" with energies equivalent to 2,000,000 electron volts, is of the familiar cyclotron type. In it particles are whirled in a spiral path through a magnetic field and are accelerated in small voltage steps at each revolution to the ultimate 2,000,000 volts peak energy of the apparatus.

Regardless of the arc which the swing describes, the time interval required for it to pass through its starting point is the same. So it is with the semi-circles described by the atomic "bullet." In each excursion, regardless of an ever-increasing radius, the oscillating "bullet" reaches the gap separating the two disks in a period of time which is constant. It is this physical principle which gives to the apparatus its resonance feature."

Science News Letter, January 25, 1936

RADIO-AVIATION

New Aviation Radio Receives 2 Signals on Same Frequency

NEW radio aid for commercial aviation is under test in Pittsburgh, Pa., which consists of the transmission of both voice and radio range signals on the same frequency. The two sets of signals are received simultaneously in an airplane—directional signals operating a needle pointer on the instrument panel and the voice signals being received in headphones.

The new development solves the problem, existing for some time, that directional beacon signals and the weather reports went out on the same radio frequency, and thus one had to be interrupted for the other.

The limited number of frequency channels available and the need for the simplest possible receiving equipment required such interrupted service in the past. With both weather and range directions on the same frequency, the pilot did not need to change dial settings on his receiver.

The old system, while simple, had its handicaps. If a pilot was flying blind and attempting to locate an airport, it was disconcerting to have the directional signals interrupted by a weather broadcast which told him it was raining or foggy in his vicinity. He knew that anyway, otherwise he would not be flying blind.

In a minor aspect the weather signals delayed his landing and in a major case might delay him at a time when the ceiling at the airport was lowering to zero-zero conditions.

Before the new development the Bureau of Air Commerce sometimes postponed weather information for a short while and kept the directional signals on the air continuously when requested by pilots.

This system also had its handicaps, for weather reports might be needed by other pilots, and planes with receivers but not transmitting equipment might need continuous directional signals and not to be able to request them.

The new development of receiving two signals on the same frequency solves all these problems.

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CHEMISTRY

"Alloy" Oil Promises Changes In Motoring Upkeep Costs

"ALLOY" oil, three times stronger than ordinary petroleum used in motor cars, is the latest answer of oil engineers in Philadelphia to the demands of increased lubrication pressures inside modern automobiles.

Alloy oil consists of 99 per cent. petroleum and one per cent. of a chemical relative of phosphoric acid.

In tests with stock cars driven the equivalent of ten years of average motoring, the new alloy oil markedly prevented wear. Measurement showed less wear than is usual for one-tenth the 100,000 miles traveled, according to Dr. T. G. Delbridge, research director of the Atlantic Refining Co.

Significance is attached to the successful development of an "alloy" oil which obtains strength without sacrifice of any other essential lubricating qualities, for the reason that the sharp reduction in engine wear effected by the new oil may permit important changes in motor design and possibly the use of new metals. This in turn may lead, in the opinion of auto engineers, to a reduction of production costs during the next decade. The wear reduction effected by the high film strength oil is alone estimated to permit a cut in national motor upkeep costs of at least $50,000,000.

"It is proper to ask," Dr. Delbridge remarks, "whether the decrease in wear made possible by this high film strength motor oil may not have effects equal to those in the building and manufacturing industries when steel was created. Any substantial reduction in the costs of operating automobiles increases the number of people who can afford to own and operate cars."

In engineering circles the development of an effective "alloy" oil is considered significant for the reason that a crisis has long been foreseen when the strength of natural petroleum, no matter how well refined, would be inadequate to meet the increasing heat, pressure and speed of moving parts developed by the high compression automobile motor. Search for an effective "alloy" oil has been carried on for some years. The problem has been to find a substance which would increase the film strength of petroleum without reducing its effectiveness in other respects.

The strengthening chemical added to natural petroleum is known technically as the non-chlorinated ester of phosphoric acid.

Science News Letter, January 25, 1936

DENTISTRY

Chemical Test May Lead to Preventing Tooth Decay

DECAY of the teeth with attendant toothaches may be prevented in the future, if a method developed by Dr. E. P. Brady of the Washington University Dental School, St. Louis, is put into successful practice.

A dental examination can determine by a chemical test which of the teeth in one's mouth are liable to decay, says Dr. Brady. Silver nitrate, a common chemical used generally for germ killing purposes, betrays the presence on the tooth enamel of certain faults of formation. It is in these faulty areas that decay is likely to start, because there the acids in the mouth and acid-producing bacteria can penetrate through the enamel to the sensitive dentine beneath.

The decay can be prevented by the use of silver nitrate, Dr. Brady said.

After it has started, its progress can be stopped by use of another chemical

called trichloracetic acid, Dr. Brady said. This substance acts to coagulate the organic material in the tooth and block any further penetration by the acids of decay into the interior of the tooth.

Nature has her own way of doing just this, under favorable conditions. When decay starts, a defense may be made in the form of a barrier of calcium deposit across the path of the penetrating acids. In laboratory tests, it has been found that acid strong enough to destroy all the rest of the tooth, will leave that defensive calcium deposit.

Science News Letter, January 25, 1936

MEDICINE

New Insulin Treatment Makes Diabetic More Nearly Normal

Supplement to Ordinary Insulin Promises To Make Adjustment of Carbohydrate Balance Easier for Some

THE "most valuable discovery in the treatment of diabetes since the original discovery of insulin" is announced in *The Journal of the American Medical Association.* (January 18)

A new preparation—protamine insulinate—is the answer found by Danish investigators to the problem of the many persons with a severe diabetes which cannot be controlled satisfactorily with insulin alone.

Protamine insulinate does not supplant ordinary insulin in the treatment of diabetes but serves as an adjunct to it. The two must usually be used in the same patient at different times each day.

For example, a person with diabetes can employ the quickly acting old insulin in the morning with a heavy breakfast and the slowly acting compound at night before a light dinner.

That is what has been done at the Steno Memorial Hospital, Copenhagen, Denmark, where Dr. H. C. Hagedorn and his associates have developed the new preparation. A similar procedure is being followed by Dr. Howard F. Root and associates at New England Deaconess Hospital, Boston, where the new preparation is also being tested.

"It would appear as if a new revolution in the treatment of diabetes must follow and the possibility created for the diabetic patient to resemble more closely a normal individual," writes Dr. Root and his co-workers, Drs. Priscilla White, Alexander Marble and Elmer H. Stotz.

"While the majority of persons with diabetes are able to adjust their carbohydrate metabolism satisfactorily by the injection of insulin several times a day, many have so delicately balanced an equilibrium that it is readily disorganized by slight overdosage or underdosage of insulin," the *Medical Journal* explains. "Wide fluctuations in blood sugar occur in these patients."

The Danish investigators have combined insulin with protamines, which are elementary compounds of amino acids containing one or more of the substances lysine, arginine and histidine. The resulting compound is relatively insoluble and tends to be absorbed slowly and over a longer time than ordinary insulin. The blood sugar lowering effect lasts about twice as long.

In presenting the work of both the Danish scientists and of Dr. Root and his associates in Boston, *The Journal of the American Medical Association* emphasizes several facts:

Protamine insulinate is still a laboratory preparation and is not yet commercially available.

The compound is somewhat inconvenient in that it must be prepared shortly before use, as it is stable at most for only a few weeks.

It does not supplant insulin but serves as an adjunct to it.

It is of no special value to persons who are now adequately treated with insulin.

Fifteen cases treated in Boston in general confirm the excellent results reported in the eighty-five cases reported from the Danish hospital.

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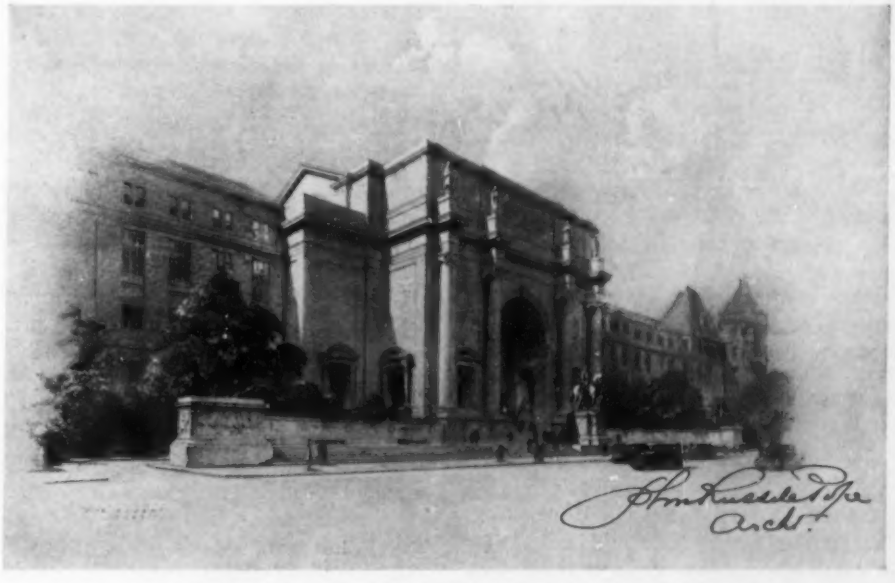
ZOOLOGY

Roosevelt Memorial Hall Honors Love of Wildlife

WILDLIFE in all its phases has an inseparable connection with the name Roosevelt. As legitimate quarry for hunting, as a vital part of the national heritage to be conserved against the effects of too much civilization, as a life-complex worthy of scientific field study, wildlife has long had the close attention of members of this most prominent Americ_n family.

Roosevelt significance to wildlife is brought to a new focus with the dedication of the New York State Roosevelt Memorial at the American Museum of Natural History in New York City, which took place on Sunday, Jan. 19. In this new great hall, appropriately near the hall dedicated to his friends and collaborator, the late Carl Akeley, Theo-



NEW YORK STATE ROOSEVELT MEMORIAL

dore Roosevelt's intimate and vigorous interest in the wild animal life of three continents will be suitably commemorated, in collections, in paintings and in sculptured mementoes of the chief events of his astonishingly varied life.

While Theodore Roosevelt never pretended to be a professionally qualified zoologist, his knowledge of the animal life he met in his travels in Africa and both the Americas ran substantially ahead of that usually encountered in even the more thoughtful and observant of big-game hunters. And the trophies of his expeditions today enrich several leading museums with scientifically valuable and popularly instructive material. His leadership, along with Gifford Pinchot, in the fight for the conservation of American forests and forest wildlife is so well known that even passing mention is almost superfluous.

That Theodore Roosevelt was only giving expression to a deep-rooted family tendency when he wrought all these works was well testified at the dedication ceremonies last Sunday. His relative now in the Presidency, Franklin D. Roosevelt, made the principal address, as representative and leader of the newer developments in American conservation. And on the same platform was the second Theodore Roosevelt, who has followed to a large extent in his father's footsteps.

Politics may amount to a veritable family row among the Roosevelts, but in matters concerning conservation of wildlife resources, they are a united clan.

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SAFETY ENGINEERING

Curb on Motor Car Speeds Will Not Prevent Accidents

THE growing demand for restraints of motor car speed as a cure for traffic accidents and deaths is about "as illogical and irrational as the dulling of the cutting edges of all knives for the benefit of the few people who are incapable of using these indispensable tools," the meeting of the Society of Automotive Engineers heard from Dr. Miller McClintock, director of Harvard University's bureau for street traffic research.

"It is quite right and proper that public officials, in the performance of their duties, should place restraints upon the use of speed under conditions which experience has proved to be productive of hazards. It should be pointed out, however," Mr. McClintock said, "that these restraints are distinctly negative in character and that they do not approach a constructive solution of the accident problem. The great majority of current fatal, non-fatal and property damage accidents result from speeds which are below any speed limits which would appear reasonable or tolerable. Statistical evidence, though inadequate, indicates that not more than six or seven per cent. of fatal accidents can be attributed to speeds of more than fifty miles per hour. A rigid physical limitation of speed to fifty miles per hour would affect only a small proportion of even these accidents. Most of them would have proved equally fatal at lesser speeds.

"The difficulty of dealing with the accident problem purely through a control of speed is illustrated by a situation of daily occurrence. Two vehicles on a rural highway are approaching each other, each travelling at thirty miles per hour. This is certainly a nominal speed and one far lower than that imposed by any state today. They meet head-on. The effect is very much as though each of them had struck a stone wall at sixty miles per hour. It is rather an academic question to ask how much more serious the consequence would have been if the speed had been higher.

Then added Dr. McClintock:

"Please do not interpret anything that is here said as an appeal for higher or unlimited maximum speeds, either in vehicle capacities or in the law. . . . Speed restrictions alone dodge the issue, can never touch more than a small fraction of the accident problem and fail to take any constructive action against the conditions that cause speed to be dangerous."

The demand for speed restraints is a healthy sign of growing public opinion on the important matter of doing something about traffic deaths, Dr. McClintock indicated, but it must be directed into the really constructive channels of thinking and not be allowed to strike at the one main value of the modern motor cars—their rapid mobility.

Motor cars, he pointed out, are no more comfortable than a well-protected stage coach, and modern trucks cannot carry more load than an old-fashioned horse drawn dray. Their usefulness lies in the fact that they extend a day's journey from 30 to 300 miles and speeds from 4 to 40 miles an hour and more.

Railroad Experience

The current demand for speed curbs, the Harvard traffic expert said, was experienced in the early days of railroading, when the railroads were considered "instrumentalities of the devil himself." The feeling was in part logical because of the repeated and ghastly train wrecks. Better rolling stock, better roadways, improved personnel and safety devices solved the problem for the railroads.

All but the last point—safety devices if a human mistake is made—are also helping the automotive problem.

Fundamental in the traffic accident problem, said Dr. McClintock, is congestion. Congestion is the factor which limits the motor car to only a fraction of its potentialities in serving society.

Accidents are caused by four types of conflicts on the highways regardless of speed (which only affects the severity of the accident), said Dr. McClintock. They are:

1. Overlaps in the paths of approaching vehicles—head-on collisions, etc.
2. Overlap between the moving vehicle and objects at side of road—impact with parked cars, bridge abutments, etc.
3. Intersection accidents.
4. "Internal stream conflict" due to the difference in speeds of vehicles moving in same direction.

Ideal Highway

The proper highway would overcome all four of these basic difficulties, says Dr. McClintock. Its requirements would be:

1. Physical separation of the two streams of traffic moving in opposite directions. The new roads with parkways down the middle meet this requirement.
2. Traffic lanes reserved for moving vehicles only. There would be no parking.
3. No grade crossings for any type of intersectional traffic.
4. Sufficient number of lanes for the segregation of fast and slow vehicles and provision for acceleration and deceleration lanes.

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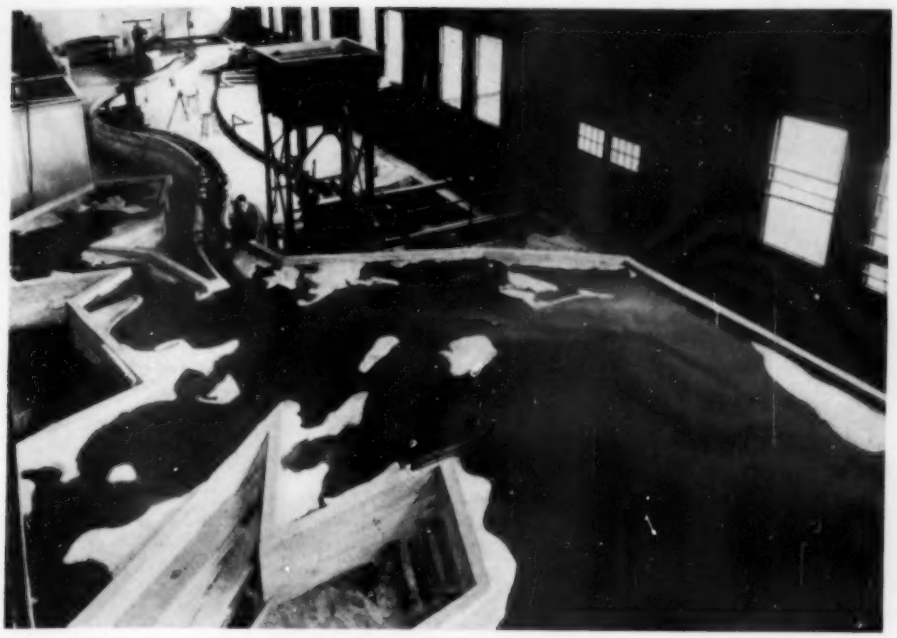

MODEL CAPE COD CANAL

Housed in the hydraulic laboratories at Massachusetts Institute of Technology is the 115-foot engineering model of the Cape Cod ship canal. A tide machine raises and lowers the water level and creates tide currents through the canal, which engineers study.

EUGENICS

Normal Population Will Not Be Swamped by Feebleminded

THE idea that the normal population will be swamped by the feebleminded unless immediate steps are taken to check the numbers of the latter is a myth, declares Dr. Abraham Myerson of Boston, in reporting the investigation of the sterilization problem made by a committee of the American Neurological Association.

Society should go slowly in adopting sterilization as a means of combatting mental diseases, epilepsy, feeblemindedness and criminality, is the advice to be found in the committee's report.

Present knowledge of human heredity is neither exact enough nor wide enough, the report states, to "warrant the sterilization of people *who themselves are normal* in order to prevent the appearance in their descendants of manic-depressive psychosis, dementia precox, feeblemindedness, epilepsy, criminal conduct" or certain other conditions studied by the committee. Manic-depressive psychosis and dementia precox are two leading forms of mental disease.

Other members of the committee besides Dr. Myerson, who is chairman, are: Drs. James B. Ayer of Boston, Tracy J. Putnam of Boston, Clyde E. Keeler, Consultant in Genetics, and Leo Alexander, Research Associate.

Recommendations of the committee with Dr. Myerson's interpretation appear in the current issue of the *American Journal of Psychiatry.* (December, 1935)

Eugenic measures such as sterilization, cannot possibly succeed in lessening the amount of crime, the committee found. The type of character which leads to criminal behavior is rarely inborn or inherited, if at all, and cannot be predicted. Sterilization in such cases is therefore characterized by the committee as "cruel and unusual punishment."

The idea that epilepsy is inherited has never been conclusively established and consequently sterilization is not recommended as a general measure for all epileptics.

The problem of mental disease and feeblemindedness is huge but there is "nothing new or increasingly alarming about it." Consequently there is no need for haste in adopting eugenic measures to control the problem or reduce its size, in the committee's opinion.

The study of heredity is still in the experimental stage, the committee finds. The laws of heredity so far known cannot yet be applied in any thorough-going fashion to human life and especially to the mental and personality diseases. The committee finds fault with the various studies already made on the inheritance of mental diseases and feeblemindedness and recommends further research on this problem.

Heredity is definitely a factor in feeblemindedness, the report states, and sterilization can be recommended for this condition unless it is a type definitely due to environment rather than heredity. The committee points out, however, that "in a world which has much low grade work to be done there is still room for people of low grade mentality of good character."

The factor of heredity or inheritance is less definite in the two mental diseases, dementia precox and manic-depressive psychosis. The environment is important, as well as the inherited factor, in producing either of these diseases.

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SEISMOLOGY

Deep-Seated Earthquake In Northern Argentina

AN UNUSUALLY deep-seated earthquake shook the northern part of Argentina on Tuesday, Jan. 14. The center of disturbance was at least 500 kilometers, or 270 miles, underground, seismologists of the U. S. Coast and Geodetic Survey stated after examining data transmitted by eight earthquake observatories, through Science Service.

The approximate location of the epicenter was in 28 degrees south latitude, 60 degrees west longitude. This spot lies in the province of Santiago del Estero, northern Argentina. The quake began at 9:12.4 a. m., Eastern Standard Time.

Stations reporting were those of the University of Virginia, the Franklin Institute in Philadelphia, Pennsylvania State College, the University of California, the observatories of the Jesuit Seismological Association at Georgetown University, Canisius College, and St. Louis University, and the U. S. Coast and Geodetic Survey at Honolulu.

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PLANT PHYSIOLOGY

Wheat "Stuffed" With CO_2 Grows Larger

PLANTS can be made to grow bigger, producing a larger seed yield, by "stuffing" them with carbon dioxide, the atmospheric gas which they use as initial raw material in food-making, Dr. Earl S. Johnston, of the Smithsonian Institution, has determined in a series of laboratory experiments.

Dr. Johnston grew wheat plants in open-topped glass enclosures, in which he maintained the carbon dioxide content at four times its usual percentage in the air. The plants produced more stalk and larger and more numerous heads than did similar plants in neighboring glass cages where only ordinary air was used.

As yet, Dr. Johnston's results, like somewhat similar results obtained in European experiments, have no practical application, since the cost of raising the carbon dioxide content of the atmosphere under ordinary field conditions is much greater than the increased yields thus obtainable would justify.

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ENGINEERING

Air Replaces Steel in Newest Type Auto Springs

AIR springs for autos, consisting of bellows, are being used to replace the ordinary leaf springs, it was revealed at the meeting of the Society of Automotive Engineers by R. W. Brown of the Firestone Tire and Rubber Company.

Still under experimental study, the air springs look somewhat like two large hot water bottles laid one on top of the other. Through tubing they connect with an air reservoir. The bellows and reservoir are filled with air to a pre-determined pressure. As road shocks are encountered the air passes back and forth between bellows and reservoir.

Tests have already indicated, said Mr. Brown, that the rubberized fabric material in the air springs will stand 8,000,000 two-inch deformations under 25 per cent. overload.

Body roll on curves is eliminated by the use of a small pendulum device hung inside the air spring which controls a valve mechanism. By valve action the air pressure on the air springs outside (on a given curve) is maintained at a higher pressure than on those on side toward the inside of the curve.

In comparable fashion the pendulum device is used to increase the pressure on the air springs of the front wheels when the brakes are applied and thus "nosing down" of the car is prevented.

Road tests of the newest development are under way on the Stout Scarab car and already indicate good driving characteristics.

Science News Letter, January 25, 1936

ASTRONOMY

300,000 "Shooting Stars" Strike Atmosphere Daily

THREE hundred thousand shooting stars as brilliant as the bright star Vega strike the earth's atmosphere each day, Prof. C. C. Wylie of the University of Iowa told the American Association for the Advancement of Science.

For years Prof. Wylie has been studying the shooting stars, or meteors, that flare into shining brilliance when they strike the atmosphere around the earth and burn themselves up.

From his studies and the investigations of other meteor observers, Prof. Wylie estimates:

1. At the present rate of fall of meteoric material less than an inch would have been deposited on the surface of the earth in the 2,000,000,000 years the earth is known to have existed.

2. Some 24,000,000 meteors daily strike the earth which are bright enough to be seen with the eye. With a telescope the number would be increased by millions.

3. About 130 meteors flaming as brightly as the full moon should be seen from a single spot on the earth's surface during a year. Six of the 130 should be of the type which detonate.

4. The fear of a giant meteor, weighing tons, striking the earth is small, for only about one meteor weighing 35 tons should hit the earth in 300 years.

Science News Letter, January 25, 1936

BIOLOGY

Bullfrog Eats Twice Own Weight in Five Months

BULLFROGS are not only big, they are big eaters.

Prof. S. W. Frost of Pennsylvania State College records (*Copeia*, No. 1, 1935) that one big bullfrog he kept in his laboratory ate more than twice its own weight in less than five months of spring and summer. Its menu included not only the conventional insect items but also such quasi-cannibalistic tidbits as toads, smaller frogs, and salamanders.

Science News Letter, January 25, 1936

IN SCIEN

ANIMAL PSYCHOLOGY

Goldfish Prefer Blue To Other Colored Lights

GOLDFISH have their color preferences, too. They like blue, Dr. N. Mookherji found from experiments reported to the *Indian Journal of Psychology*.

The fish were allowed to pick their favorite color by making a choice of four stalls into which they might swim. Each stall was lighted by a candle shining through a piece of colored glass. The number of times the fish entered each stall and the lengths of time they lingered were counted and tabulated.

Blue was the favorite, and then came green, yellow, and red.

Science News Letter, January 25, 1936

MEDICINE

Helium Treatment For Asthma Made Cheaper

REDUCTION in the cost of helium treatments for asthma is now possible through improvement in method, Dr. Alvan L. Barach of Columbia University School of Medicine has announced.

Dr. Barach is the originator of the method by which patients suffering from severe asthma are given relief by inhalation of a mixture of oxygen and helium. Because helium is a very light weight gas, it requires only half the effort to breathe the oxygen-helium mixture as to breathe ordinary air, Dr. Barach found. This gives the patient's breathing muscles considerable relief and rest. While not a cure for asthma, the helium treatment has been found an effective remedy in combination with adrenalin.

Helium, however, is an expensive gas, so only a few patients could get the benefit of the treatment. Dr. Barach announced a method of re-using the helium, thus reducing expense. After the gas has left the patient's lungs it is circulated through soda-lime and returned to the apparatus to be used again.

Science News Letter, January 25, 1936

E FIELDS

BIOLOGY

Vitamin C May be Essential For All Living Matter

SCURVY-preventing vitamin C, now obtainable in pure form as well as in fresh fruits and vegetables, may be essential for the continuance of even the simplest forms of life, according to the researches of Dr. Geoffrey Bourne and Russell Allen of the Australian Institute of Anatomy.

In recent technical communications to the scientific journal, *Nature* (Vol. 136, page 185, 1935) and the *Australian Journal of Experimental Biology*, (Vol. 13, p. 165, 1935), these two scientists pointed out that when the silver nitrate staining reagent, which is specific for vitamin C, was applied to such simple forms of life as protozoa, bacteria, yeast, seaweed and various parasitic fungi, black granules were found to be formed by its action, thereby indicating the presence of very small quantities of the vitamin. In view of these results the authors have "suggested that vitamin C is essential for the existence of living protoplasm."

These two scientists also find that the granules of vitamin C are greatest in number where the plant or animal is growing fastest and they consider that vitamin C plays a vital part in the chemical life of the living cell.

Science News Letter, January 25, 1936

EVOLUTION

Expedition Searches For Origin of New Species

RENEWED search for the origin of new species among living organisms is being launched through a 10,000 mile scientific expedition into Mexico and Central America, under joint auspices of the National Research Council and Indiana University.

Dr. A. C. Kinsey, Indiana University zoologist and veteran of 65,000 miles of search to discover how new species develop, is at the head of the expedition. His interest lies particularly in the gall wasp, a tiny insect less than an eighth of an inch long. Dr. Kinsey's collection of these insects in the biological laboratories of Indiana University numbers 1,500,000 specimens, the largest collection of its kind in the world.

Dr. Kinsey's findings thus far as to the evolutionary chain of developing species are not in accord with Darwin's theory of gradual variation of species. Dr. Kinsey holds rather for a theory of mutation. He maintains that there is a sudden change in species.

Life histories of the gall wasp seem to prove that heredity exerts greater influence than environment in the evolution of species. Gall wasp larvae sent to the Indiana University laboratories from Finland mature at exactly the same time that they would have matured in Finland, despite the warmer climate of Indiana. Likewise, Mexican gall wasps mature there at the same time that they would have matured in Mexico.

Summarizing the results of his fifteen-year research on the nature and origin of species, Dr. Kinsey expresses the view that evolution is not of a treelike character. "The evolutionary pattern," he maintains, "is not that of a 'tree of life' in which the main branches represent older, ancestral stocks which disappeared as they gave rise by radiate evolution to the twigs (the species) which are the present-day ends of the tree." The pattern is that of an infrequently dividing chain of species in which the oldest may remain coexistent with all of the derived species.

Science News Letter, January 25, 1936

PLANT PATHOLOGY

Elms Attacked by Disease, Apparently All-American

ELMS, attacked in the East by the alien fungus of the Dutch elm disease, are now menaced in the Midwest by another fungus, apparently native American, Drs. Leo R. Tehon and Homer L. Jacobs of the Illinois State Natural History Survey reported to the American Association for the Advancement of Science.

The disease made its first appearance in the neighborhood of Dayton, Ohio, several years ago, attacking elms both in the natural timber and in street plantings. The symptoms include droop, wilting, yellowing and falling of leaves, rotting of small roots, and bark disintegration.

One fungus, to which the provisional name *Cephalosporium* has been given, has been isolated and in transfer tests under carefully controlled conditions has reproduced the symptoms of the disease.

Science News Letter, January 25, 1936

AERONAUTICS

Soviets Invent Glider That Packs in Suitcase

LATEST Russian invention to advance interest in the sport of gliding is a rubber glider which, when deflated, will go into an ordinary suitcase.

The glider is a shapeless bag of rubber when removed from its case. It is spread out on the ground, a hard rubber tail piece and certain stiffening parts inserted and then the rubber is inflated through various valves. Tests in the air show the device does not collapse and well obeys the controls of flight.

Its weight is 92 pounds, its length 29 feet and its wingspread 30 feet.

Science News Letter, January 25, 1936

ENGINEERING

Huge Scoop Shovel Lifts Largest Truck With Ease

See Front Cover

ONE of the largest scoop shovels in the world, weighing 2,000,000 pounds and towering as high as a 14-story building, is in operation at strip coal mining operations at Seelyville, Ind.

Coupled with the mining operations are giant motor trucks and trailers which haul 30-ton loads of coal; so huge and heavy are they that they are not permitted on public highways and can be used only on the company's grounds.

The illustration on the front cover of this week's SCIENCE NEWS LETTER shows the shovel in the act of lifting the huge truck. In 1930, a 320,000-pound steam shovel with 20 cubic yard scoop capacity, then the largest in the world, was pictured on the cover. (See *SNL*, Jan. 18, 1930).

Strip mining is employed in regions where coal beds lie relatively near the surface. The top soil or caprock covering the coal bed is stripped off by shovels and the actual coal mining is of the open pit type. At Seelyville, a bed of high grade bituminous coal is being exposed which, it is expected, will keep the gigantic equipment busy for the next 15 years.

Movable under its own power on caterpillar treads, the shovel clears a path 75 feet wide for itself as it moves over the buried coal bed. From the giant 140-foot tower, the shovel, with a capacity of 30 cubic yards, can lift material and dump it as much as 215 feet away, and can deposit on a pile as high as 70 feet.

Science News Letter, January 25, 1936

ASTRONOMY

Leap Year

This Month the Addition of a Day to Adjust the Calendar Calls Attention to Its Imperfections

By JAMES STOKLEY

JUST as we seldom pay attention to a part of our body until an ache or a pain calls it to our attention, so do we take our calendar for granted most of the time. But during next month, February in a leap year, we have to make the adjustment that reminds us that even the best calendar is not all that could be desired. As a matter of fact, a calendar perfectly accurate is impossible because it has to measure two different units which are of such a size that one cannot be expressed as an exact multiple or fraction of the other.

In most of our systems of measure—length, area, money, etc., — the units are arbitrarily chosen so that a smaller one goes evenly into those that are larger. Thus, there are twelve inches in a foot, a hundred cents in a dollar. But in measuring time we have two natural units. One is the time the earth requires to turn on its axis, the day. The other is the time that the earth requires to make one of its complete circuits around the sun, the year.

The number of days in a year is approximately 365¼. Expressed more precisely, the number is 365.24219, but even this is not exact. No matter how many numbers we write after the decimal point, the ratio can never be expressed absolutely — the mathematician says that the year and the day are incommensurable.

The Month

Even this is not all, for there is another natural unit, the month, which is based upon the time between successive appearances of the moon at the same phase, and this length of time is not commensurable with either the day or the year.

The older calendars were mostly based on the moon, as among the Hebrews and the ancient Romans. However, it was inconvenient to have the same month occurring at various times in different seasons of the year, and so the Romans would occasionally add an intercalary month, an extra one, to bring the months and the seasons into step once more. But this was left in the hands of officials to whom graft was not unknown, and it was a fruitful source. For instance, if a magistrate had been elected for a certain period, he could extend his term for a time by the device of adding a month at the right moment.

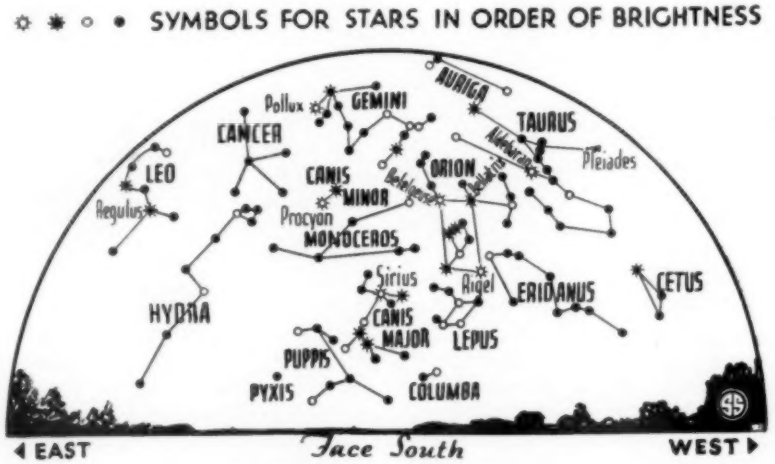
Julius Caesar reformed this, upon the advice of the astronomer Sosigines. He ignored the moon completely and assumed that the length of the year was 365¼ days. So he introduced the idea of the leap year. Ordinary years were to be of 365 days, so that after four years, the extra quarter of a day in each would amount to a full one, and then the year's length would be 366 days.

Not Accurate

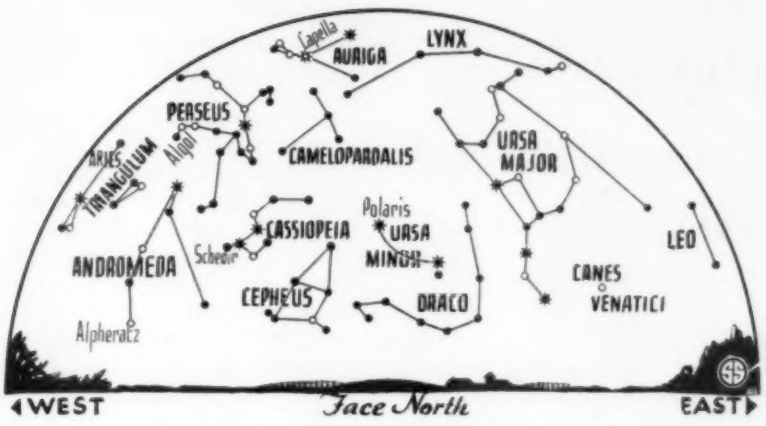
But this was not entirely accurate, although it worked for a long time. The slight amount that the year is shorter than the period Caesar adopted amounts in the course of a thousand years to nearly eight days. By the year 1582 the error was about 13 days, and then Pope Gregory XIII introduced a new reform. Like Caesar, he also called in astronomical aid, in the person of one Clavius. He brought it back, not to the time of Caesar, but to the way it was in the year 325, the date of the Council of Nicaea, which had, among other matters, decided on the means of calculating the date of Easter. To do this ten days were dropped completely, and to prevent the calendar getting out of step soon again, he decreed that thereafter a year beginning a century should be a leap year only if it were divisible by 400, while ordinary years should, as before, be leap years if they were divisible by four. Thus, in four centuries there are a hundred leap years according to the Julian calendar, but only 97 by the Gregorian. This reduced the error so that not until some three thousand years have passed will it be in error as much as a day.

Next Reform

Probably the next reform that will be made in the calendar will be to make every year the same, so that the 25th of December, for example, will always come on Wednesday. There have been two suggestions by which this might be done. One is to have a year of thirteen months instead of twelve, each exactly four weeks, or twenty-eight days, in length. Thirteen times twenty-eight, however, is 364, one day less than an ordinary year and two less than a leap year. Therefore, it is proposed that the year should begin with a "Year Day," which would not belong to any month or week. A second such day would be inserted in the calendar every fourth year, at the beginning of summer, and called "leap day," so that this would take care of the leap year.



DOGS GREAT AND SMALL



GUIDING STAR

The mariner's guide, the ever faithful North Star, will serve as an aid to you also, in locating the constellations of the northern heavens.

Another proposed calendar revision is the so-called "World Calendar," of twelve months, with the four quarters of the year equal, 91 days to each. The first month of each quarter, that is, January, April, July and October, would start on Sunday, and have 31 days. The second months of each quarter, February, May, August, and November, would start on Wednesdays and have 30 days, while the remaining months would each begin on Friday and have 30 days. Here also, a "year day" would be used between the last day of December and the first of January, as well as a "leap day" every fourth year, which would come between June 30 and July 1.

Start on Sunday

It has been suggested that 1939 would be a good year to start calendar revision because it begins on a Sunday. But because of the inertia in changing an institution so long established as our present calendar, it hardly seems likely that the necessary agreement of many different nations could be obtained so soon. Possibly by 1950, when the year again begins on Sunday, the change may be possible.

Astronomers are relatively unconcerned about calendar change because they have solved the problem of calendar irregularities by following the practice of giving every day its own serial number and using that in their records and computations. This number is called the Julian day. Feb. 1, 1936 has the Julian number of 2,428,195.

As winter draws nearer to its close, during the month of February, the constellation of Leo, the lion, appears in the eastern sky. The brightest star is Regulus, in the beast's shoulder. This star is also a part of a group called the Sickle, and marks the end of the handle, which is directed towards the south. The blade curves up and then southwards, and the stars that form it are the same as the ones that indicate the head of the lion. Below, and farther north, is a triangle of stars which represent the rest of the lion. Denebola, at the lowest corner of the triangle, is the end of his tail.

Great Dipper

In the northeast is the Great Dipper, the handle hanging downwards, part of Ursa Major, the great bear. The two stars at the top of the bowl are the Pointers, which show the direction of Polaris, the pole star, itself at the end of the handle of the little dipper.

But the most brilliant of all the stars visible at any time of year in the nighttime sky is directly south at the time for which the maps are prepared. This is ten p. m. Eastern Standard Time at the beginning of February, nine o'clock on the fifteenth, and eight on the twenty-ninth. The star is Sirius, the dog star, part of Canis Major, the great dog. It is bright because it is close, as no other star ordinarily seen from the United States is closer. Its distance is more than eight light years, for it is so far away that the light from it takes more than eight years to reach the earth, though travelling every minute about eleven million miles.

The other celestial dog, Canis Minor, is higher in the sky, and to the left, containing the bright star Procyon. To the right of Sirius is the great warrior, Orion, which can be recognized easily from the three stars in a row that are supposed to form his belt. The ruddy star above these is Betelgeuse, in one of his shoulders, while a little to the west is Bellatrix that marks the other shoulder. Below the belt is Rigel, in one of his legs, while the fainter star, Saiph, to the left, is in the other.

Overhead Capella

Still higher than Orion, almost directly overhead, is Capella, part of Auriga, the charioteer. A short distance to the east of the zenith is Pollux, the brighter of the twins, Gemini, Castor being his brother. To the right of Orion one can see the bull, Taurus, in which a V-shaped group of stars, the Hyades, outline his face. Among these is Aldebaran, distinctly red in color, which is the eye. A short distance farther to the right, in the bull's shoulder, are the Pleiades, the "seven sisters" of mythology, of which six can ordinarily be seen with the naked eye. Many more are revealed with the aid of a telescope, or even a pair of opera glasses.

Over in the northwestern sky is a constellation shaped like the letter W on one side. This is Cassiopeia, a queen of ancient Ethiopia, according to the mythological account. Her daughter, Andromeda, is marked by the constellation next to the south.

During February no planets are in a position where they may be seen well during the evening, though a glimpse may be obtained of Mars in the west soon after sunset. Mercury is now a morning star, and rises longest before the sun about the 26th, when one may be able to see it in the morning twilight. Jupiter and Venus may also be seen in the early morning hours, Jupiter rising first. The moon in February is full on the 7th, at last quarter on the 15th, new on the 22d and at first quarter on the 28th. Apogee, the time when it is farthest from the earth, occurs on the 11th, with a distance of 252,000 miles, while perigee, when it is closest, comes on the 17th. Then only 223,250 miles will separate us.

Moon's Phases

The moon is full on February 7 at 1:19 a. m. E. S. T., at last quarter on February 15 at 10:45 a. m., new moon on February 22 at 1:42 p. m., and at first quarter on February 29 at 11:28 p. m.

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"A fully developed swordfish is probably the fastest swimming creature in the world," says a writer in Natural History.

GENERAL SCIENCE

Federal Budget Includes More Money for Science

But Part of Increase Is Only Matter of Bookkeeping Due to Transfer of Emergency Funds to Regular List

FUNDS for scientific research by the Federal Government will be increased by about $5,000,000 during the fiscal year starting next July if the allotments in President Roosevelt's budget are followed by Congress in making appropriations.

Part of this increase in funds represents only a paper increase due to the transfer of items from the emergency budget to Uncle Sam's regular accounts. Part of it represents new funds under recent special legislation.

The Department of Agriculture receives most of the $5,000,000 increase, with an estimated $3,500,000 more to devote to research than was available last year. New agencies will absorb the lion's share of this. First there is the Soil Conservation Service, provided for by new legislation last April. This will get $2,250,000 of the available research funds.

Special Research Fund

Then there is a special research fund provided for by the Bankhead-Jones Act of June 29, 1935, under which $400,000 will be administered. Funds made available through the operation of this Act have already enabled the launching of nearly forty research projects on fundamental problems in biology, chemistry, meteorology and economics that have more or less direct bearing on agriculture.

The Beltsville, Md., research center will use about $50,000.

The Forest Service will receive an estimated extra $300,000. However, this amount is less than the emergency funds now available for research purposes but which will probably be withdrawn or curtailed next year. The $100,000 alloted for forest products investigations is mainly for the Forest Products Laboratory. This amount, unless augmented by other funds, will not be sufficient to maintain the Laboratory in its present running order. Other increases will enable some of the regional stations to maintain or even slightly enlarge their regular staffs, but these increases are based upon specific projects and must be used in those definite ways.

The Bureau of Chemistry and Soils has another large slice of the new funds —about $150,000. Of this, a part is to provide for a new program of research provided for by Congress on discovering industrial uses for farm products, but the major part is to be used toward the completion of the national soil survey.

The Public Health Service will get about $1,350,000 more for research than their funds for the present year. This represents the funds provided for by the Social Security legislation.

The Coast and Geodetic Survey will receive about $240,000 more next year, but this again will probably have to replace emergency funds.

Bureau of Standards

The National Bureau of Standards, one of the chief scientific bureaus of the Government, will receive $52,000 more under the proposed budget than the present year's appropriations. None of this will be available for scientific research, however. The Bureau must do a certain amount of routine testing of materials, instruments, and so on, and the new funds will provide for an increase in this work and for some necessary improvements in the plant.

The total amount for scientific research and the administration of scientific bureaus and offices comes to about $42,000,000 in the budget for the fiscal year 1936-37. This is a great deal more than has been spent for this purpose in recent years. But it represents only about six-tenths of one per cent. of the total budget.

The proportional amount spent for scientific work is always only a fractional part of the total expenditures. In 1932, a "boom" year for scientific work, about eight-tenths of one per cent. of the total budget went for this purpose.

Compared with these figures, $1,727,850,866 is provided in the new budget for national defense and veterans' pensions and benefits. This is more than 25 per cent. of the total.

Science News Letter, January 25, 1936

RADIO

January 28, 4:30 p. m., E.S.T.

MIDWINTER HEALTH — Dr. R. R. Spencer, Senior Surgeon, U. S. Public Health Service.

February 4, 4:30 p. m., E.S.T.

A FUTURE FOR AMERICA'S BIRDS AND BEASTS — Ira N. Gabrielson, Chief of the U. S. Bureau of Biological Survey.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

CHEMISTRY

Research Funds to Find Uses for Farm Products

INCREASED funds for research to find industrial uses for farm products are called for by the Department of Agriculture budget now before Congress. Reorganized set-ups in the Bureau of Chemistry and Soils are expected to bring the efforts of Government scientists to bear on this problem with greater efficiency.

One grouping of projects brings together the work of the present Color Laboratory at Arlington, Va., researches now in progress at Ames, Iowa, and certain work hitherto under the Agricultural Chemical appropriation, under the general head of industrial utilization of farm products and by-products. In this new grouping are included research on tanning and tanning materials, aimed, among other things, to find suitable substitutes for tanning extracts formerly obtained from the now blight-exterminated chestnut trees. The appropriation for this purpose has been increased from $10,400 to $15,400.

The laboratory at Ames is scheduled to receive a substantial increase in its appropriation—from a current $27,641 to an asked $47,641. This substantial increase is needed to expand the work of the laboratory, which is devoted mainly to finding economic uses for farm wastes —turning into dollars things which the farmer has hitherto had to throw away or burn. Uses of wastes and semi-wastes like straw and cornstalks for paper pulp is one line of work being carried on there.

Research on production of direct-consumption cane sugar in the continental United States and on standardization of quality of sugar-cane syrup is booked to receive a $10,000 increase. Means for preventing farm fires is also

in for a $10,000 boost, and a $10,000 increase is listed for research on the chemistry and physics of soils. Naval stores research is to have a $2,500 increase.

The heaviest single item of increase in the entire Bureau of Chemistry and Soils is a jump from the present $286,000 to $381,000 in the new budget, toward completion of the national soil survey. This $95,000 increase, however, represents new money only in part; part of the fund simply replaces an earlier cut made during an economy drive, which had to be made at the time but resulted in slowing down the soil surveying and mapping program.

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ARCHAEOLOGY

Stone Age Paintings Show Hunters, Warriors, Game

DID gentlemen of the Late Stone Age entertain "visiting firemen" in their lodge meetings? One picture, lately discovered on a cliff in eastern Spain, might indicate something of the sort. It is a lively, though crudely drawn, silhouette of a man climbing what appears to be a rope ladder. The figure wears only a breech-clout and a headdress of what look like feathers.

More prosaically, the picture probably represents a common means of getting up and down the steep rocky cliffs, in the niches of which the tribesmen painted hundreds of pictures of human beings, game animals, and other living things. The paintings have been studied by Prof. Hugo Obermaier of the University of Madrid. (*Forschungen und Fortschritte*, Nov. 20, 1935.)

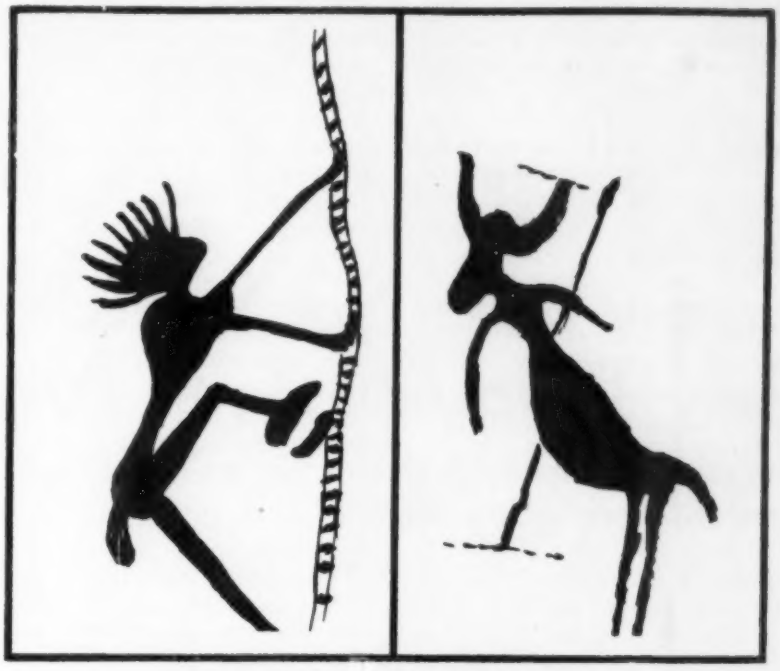
The paintings are all in silhouette, usually monochrome, occasionally two-color. Their style is much inferior to that of the earlier art of the Old Stone Age as found in the caves of southern France and northern Spain, but it still represents clearly the kinds of animals the men of the artists' tribes hunted, and shows other interesting facts of their lives.

For one thing, war was probably in the world by then. Some of the scenes show marching armed men—hundreds of them—keeping close, ordered ranks. One individual painting shows a luckless individual transfixed by a spear, kicking in his death-agony. Bows and arrows are common; these weapons were unknown in the Old Stone Age.

Hunting scenes are shown in lively fashion, many of the animals being represented as shot down with arrows, or lying helpless with broken legs. Most abundant among the game are deer, ibex and wild pigs. One boar is shown lying kicking on his back, as though mortally wounded.

One exceedingly curious picture is of a fat spider, with flies buzzing about. Prof. Obermaier conjectures that this may be the cave-artists' tribute to the spider as an exceedingly skilled snarer of game in nets.

Science News Letter, January 25, 1936



REALLY OLD SPANISH MASTERS

Artists of the Late Stone Age, 10,000 years ago more or less, painted these silhouettes on a cliff in Spain. The ladder-climbing figure, upper left, seems to have feathers in his hair; what looks like a tail is probably a loose end of his "Gunga Din" uniform. Opposite him is a figure in an animal mask—possibly a medicine man.

PHYSICS

Atoms About You Are Exploding One By One

THE ATOMS of the air about you are exploding one by one and filling the room where you sit with showers of their fragments. Surprised?

Did you know the projectiles causing those atom explosions have traveled millions upon millions of miles across interstellar space?

These facts, almost taxing one's credulity, were established in the latest cosmic ray research in a mountain top laboratory on the summit of Pike's Peak.

Dr. Carl Anderson and Dr. Seth Neddermeyer of California Institute of Technology reported the findings of their mountain experiments to the American Physical Society.

To study the effect of cosmic rays having greater disintegrative power than those found at sea level, Drs. Anderson and Neddermeyer took, by truck, several tons of apparatus from Pasadena to Pike's Peak. Working night and day they packed a year of experimental measurements into a few months.

Using Dr. Anderson's Wilson Cloud

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Chamber apparatus, already famous as the equipment wherein the positron was first discovered, they made over ten thousand photographs of the atom explosion tracks caused by cosmic rays.

Evidence was found indicating that many of the tracks were caused by a heavy type particle.

The terrific speed with which the atomic fragments were ejected in some cases represented more energy than could come from the nucleus of the struck atom alone. The fragments must, therefore, take up some of the energy of the incoming cosmic ray.

Science News Letter, January 25, 1936

MEDICINE

Leprosy Does Not Spread in Many Temperate Zone Areas

Stimulating Climate Suggested as Factor That Checks Spread of Disease; United States Practically Free

THE DRIVE of a stimulating climate such as is enjoyed in the northern part of the United States, may be an effective check to the spread of leprosy, Dr. C. A. Mills of the University of Cincinnati College of Medicine told members of the American Society of Tropical Medicine.

Dr. Mills sees leprosy sweeping over the entire world in the next century, as it did in the Middle Ages, if the trend toward higher world temperature continues. Meanwhile, he suggests moving the National Leprosarium from Carville, La., a place of low climatic drive, to Bismarck, N. D., the most stimulating spot available.

A stimulating climate is a vitally important factor for the existence of both men and other animals, Dr. Mills believes as a result of years of investigation of the relation of climate to health. The climate which he finds leads to increased bodily vigor, vitality and resistance to infection is one characterized by frequent daily changes in temperature without great extremes of heat or cold.

Comparing the distribution of leprosy over the earth with the vigor of the climatic drive shows that the regions of least stimulation are the ones where leprosy is worst, Dr. Mills pointed out.

"With very high indices of climatic drive, such as 26 in North Dakota, human resistance rises so high that the disease simply cannot be implanted, as witnessed by the disappearance of leprosy in and around Minnesota after scores of cases had been imported among the Scandinavian immigrants," Dr. Mills said.

"Within all individual countries this relationship of leprosy to climatic stimulation holds fairly well, increasing altitudes in tropical countries serving to provide temperate zone climatic effects."

The enigma of why leprosy has been prevalent in the Scandinavian countries is also explained by Dr. Mills on the basis of climatic drive. The prolonged benumbing cold for so many months of the year in these countries lowers man's resistance to disease much as tropical heat does. Dr. Mills' map of climatic drive shows most of Scandinavia to fall under a climatic drive similar to that which affects the Mediterranean countries.

Dr. Mills questions whether control of leprosy during recent decades has been due more to segregation of the patients or to the changing factor of climatic stimulation. He suggests that moving lepers to a stimulating climate may be more effective in checking the disease than segregating them in a region lacking the drive of a stimulating climate.

Little Danger in U. S.

The observation that leprosy does not spread in many parts of the temperate zone which embraces most of the United States was made more than ten years ago by Dr. G. W. McCoy, director of the National Institute of Health, U. S. Public Health Service.

There is practically no danger of becoming infected with leprosy in the United States, excepting in certain areas in the south, Dr. McCoy says. He does not, however, suggest climate as the factor which prevents the spread of leprosy in the major part of this country. What the reason may be is still unknown in his opinion.

Some of the lepers in the United States probably acquired the infection abroad, Dr. McCoy points out. The history of these shows that at some time each lived in a foreign country where the disease is prevalent. The remainder were infected in the endemic areas of this country. It takes a long time for leprosy to develop following infection, 25 years in a recent case, which explains why the disease may not have been discovered until after the patient had been living in this country again for some time.

Leprosy, Dr. McCoy explained, like measles or other communicable diseases, probably rises and falls in a more or less regular curve with high points on the curve when there is much leprosy and low points when it is less frequent. But the leprosy curve is much longer than that for other diseases and it takes two or more generations to go from a high point to a low one. This may explain why leprosy seems to disappear in a country as it has in Norway where it was once very prevalent.

Science News Letter, January 25, 1936

Cheese is 90 to 99 per cent. digestible, says the North Dakota Agricultural College.

Death Valley, noted for its summertime heat, is cool enough in winter to call for evening fires.

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ENTOMOLOGY

NATURE RAMBLINGS

by Frank Thone

Hairy Monsters

ABOUT this time of year, banana spiders begin to get into the news. It's a poor town that can't produce at least one spider scare per winter. Some grocer or fruitseller, unpacking a fresh bunch of bananas, will suddenly jump back with a yell, and when he can get his voice back will tell, with teeth still chattering, of this deadly monster that was "within an inch of my hand." Thereafter the huge spider will be herded into an empty glass jar and kept for a time, for the goose-fleshed edification of the customers, eventually ending up in alcohol or formalin in some local collection of natural history objects.

The thrill we get out of these monster spiders—big as Airedale pups, and quite as hairy—is based primarily on fear. Even if you are one of those who "aren't afraid of spiders, but just don't like to handle them," your reaction is at bottom a notion that you might get bitten, and a dread of the unknown consequences. We are at heart all grandchildren of Little Miss Muffet.

As a matter of fact, it is just as well not to become too familiar with one of these hairy unintentional immigrants from the tropics. Although they are very sluggish, and apparently not overprone to bite, a bite might make you pretty sick for a while if one of them did fang you. Of course, the notion that you will die instantly if such a spider bites you is sheer fable. For most persons, the result would be severe illness; one with a weak heart might possibly be killed.

Incidentally, it is not quite correct to call these creatures tarantulas. The real tarantulas are considerably smaller spiders that live in burrows in the earth. A number of species of them are native to the United States, particularly to the South and the Southwest; smaller ones range fairly far up into the northern states. "Fruit spiders" would be as good a name as any, for the ones we import with our bananas.

Science News Letter, January 25, 1936

•First Glances at New Books

Research

INDUSTRIAL PROSPECTING — C. F. Kettering—*National Research Council*, 3 p., 25c. "Ket" tells us we are "fifteen or twenty years behind our social and economic development in our scientific development." More Ketterings: "We should all be concerned about the future because we will have to spend the rest of our lives there. . . . Today, as never before, we need new things . . . The calendar is our hardest task master."

Science News Letter, January 25, 1936

Psychology

HOW PEOPLE LOOK AT PICTURES—Guy Thomas Buswell—*Univ. of Chicago Press*, 198 p., $3. An interesting report of research on the psychology of perception in art.

Science News Letter, January 25, 1936

Research

ABSTRACTS OF THESES, RESEARCHES IN PROGRESS, AND BIBLIOGRAPHY OF PUBLICATIONS—Graduate School, University of Pittsburgh—*Pub. by the University*, 425 p., Free to colleges, universities and libraries by applying to the University of Pittsburgh.

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Astronautics

STRATOSPHERE AND ROCKET FLIGHT (ASTRONAUTICS) — Chas. G. Philip—*Pitman Pub. Corp.*, 118 p., $1.25. Popular style book on what is coming to be known as the new science of astronautics.

Science News Letter, January 25, 1936

Engineering

THE STEADYFLOW TRAFFIC SYSTEM —Fritz Malcher—*Harvard Univ. Press*, 91 p., 85, xxv, illustrations, $1. A scheme for making traffic safer by eliminating right-angled intersections of traffic, traffic lights and traffic officers; separating by middle strips all two-way streets and thus leaving pedestrian protection the only concern of traffic control. The cost of steadyflow highways would be two-fifths that of the stop-and-go highways as an uninterrupted traffic lane would have two and one-half times traffic effectiveness of a similar stop-and-go lane. A posthumous volume, issued as Harvard City Planning Studies IX.

Science News Letter, January 25, 1936

Physics

RELATIVITY PHYSICS—W. H. McCrea —*Methuen & Co., Ltd., London*, 87 p., 2s. 6d. The applications of relativity to the field of physics are fairly familiar to physicists but the standard derivations have been widely scattered. Prof. McCrea collected them in this compact book and derives them without the use of tensor calculus.

Science News Letter, January 25, 1936

Ichthyology

1001 QUESTIONS ANSWERED ABOUT YOUR AQUARIUM—Ida M. Mellen and Robert J. Lanier—*Dodd, Mead*, 450 p., $3. This book might well be styled, The Longer Catechism for Fish Fanciers. The question-and-answer method of imparting information is time-tested and very effective; and the authors have succeeded in packing a veritable encyclopedia of aquarium information into one averaged-sized volume. Many of the halftone illustrations are rather poor; it is hoped that this defect may be remedied in future editions.

Science News Letter, January 25, 1936

Geology

THE MODERN FLOOD THEORY OF GEOLOGY — George McCready Price—*Fleming H. Revell Co.*, 118 p., $1.25. Prof. Price renews his attack on the established tenets of geology, undiscouraged by chill indifference to himself and his diatribes on the part of scientists, and the fact that his literalistic views on Scripture are unnecessary to the thinking of practically all theologians. A Quixote of geology, if there ever was one!

Science News Letter, January 25, 1936

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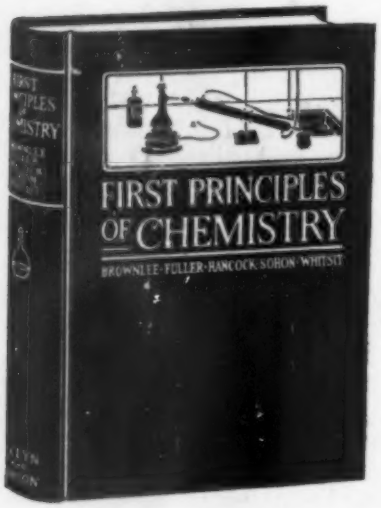
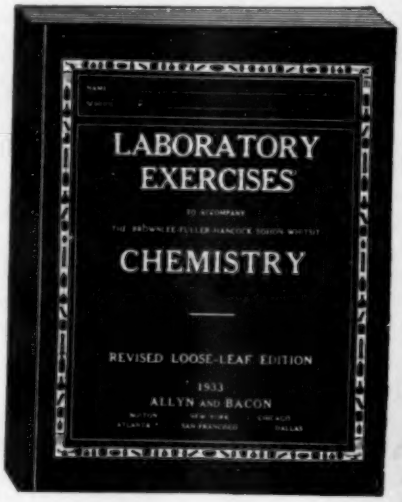
THE WORLD OF CHEMISTRY

WE LIVE our lives amid material things. To the understanding of this environment man has given centuries of toil and thought. Slowly superstitions have given way to scientific facts. Great minds have delved in obscurity to bring forth scientific principles. When these were numerous enough and became properly classified, the sciences of today came into being.



The pathways to the sciences were not dull and humdrum, for along the road lay adventure, romance, and even tragedy. Ever the scientist sought the truth. Always he regarded his labors as vain unless he gave a better understanding of the world about him and turned his discoveries to the service of mankind.

Chemistry offers a rich field to the inquiring mind and brings great reward to those who understand its teachings. It is of constant practical value. It tells how to select proper materials for every kind of construction. It has rendered available many metals and special alloys that make our trains, automobiles, and airplanes more serviceable. It has made the soil more fertile and has revealed the nature of our food. It shows us that the human body is a living chemical laboratory, and that even thought has a chemical basis.



The modern textbook in chemistry reflects its history, spirit and service to mankind. It is not a mere epitome of facts—scientific principles serve as luminous guides along the course the learner must take. Vivid illustrations and simple language make clear the practical applications of science. There is careful selection of valuable topics properly grouped. There are devices for testing the learning of the student in accord with modern educational practice.

Tested laboratory exercises supplement the ideal textbook and guide the student in his first-hand study of chemical phenomena. They make him appreciate the vividness of chemical reactions and train him to draw only those conclusions justified by the observed facts.

Best of all, the study of chemistry in this modern manner trains the mind in straight, honest thinking—the true preparation for facing the realities of the present day.

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